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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,750	08/04/2003	Hidegori Iimi	4041J-000750	5351
27572	7590	02/23/2007	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303			ALHIJA, SAIF A	
			ART UNIT	PAPER NUMBER
			2128	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/23/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/633,750	IIMI ET AL.	
	Examiner	Art Unit	
	Saif A. Alhija	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 20 November 2006.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1,3,4,6-10,12,13 and 15-19 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1,3,4,6-10,12,13 and 15-19 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 04 August 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1, 3, 4, 6-10, 12, 13 and 15-19 have been presented for examination.

Claims 2, 5, 11, and 14 have been cancelled.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 3, 4, 6-10, 12, 13 and 15-19 have been considered but are moot in view of the new ground(s) of rejection.

i) Applicants arguments regarding the 101 rejection of claims 1, 3, 4, 6-9 and 19 are withdrawn in view of Applicants amended step of outputting. However the 101 rejection of claims 10, 12-13, and 15-18 is maintained. See rejection below.

ii) Applicant argues that the reference does not disclose "temperature gradient of the melted material is divided by a square root of a cooling rate of the melted material. It is noted that the formula in question is expressly disclosed in Naoki 134 and Naoki 136, both NPL documents submitted by Applicants in their IDS dated 4 August 2003. See rejection below.

Claim Objections

3. **Claim 19 is objected to** because of the following informalities:

The claim recites "for a designing" which should read "for designing."

Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

MPEP 2106 recites:

The claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and tangible result" State Street 149 F.3d at 1373, 47 USPQ2d at 1601-02. A

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process that consists solely of the manipulation of an abstract idea is not concrete or tangibles. See *In re Warmerdam*, 33 F.3d 1354, 1360, 31 USPQ2d 1754, 1759 (Fed.Cir. 1994). See also Schrader, 22 F.3d at 295, 30 USPQ2d at 1459.

4. **Claims 10, 12-13, and 15-18 are rejected** under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

i) Claim 10 recites a single means representing a means for an output step. However, since the claim is a method there is no useful, concrete, and tangible result since no method output step is provided.

Appropriate correction is required.

All claims dependent upon a rejected base claim are rejected by virtue of their dependency.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. **Claim 10 is rejected** under 35 U.S.C. 112, first paragraph, for undue breadth. The method claim contains a single means and is therefore nonenabling for the scope of the claim because the specification disclosed at most only those means known to the inventor. See MPEP 2164.08(a). It is also noted that claim 10 is a method claim and not a means for claim, as per the preamble.

All claims dependent upon a rejected base claim are rejected by virtue of their dependency.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be

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patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. **Claim(s) 1, 3-4, 6-10, 12-13 and 15-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ebisu et al. "Method and Apparatus for Continuous Casting"**, U.S. Patent No. 6,241,004, hereafter referred to as **Ebisu in view of Naoki et al. "134th Japan Lecture Convention"**, hereafter "**Naoki 134.**"

7. **Claim(s) 1, 3-4, 6-10, 12-13 and 15-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ebisu in view of Naoki et al. "136th Japan Lecture Convention"**, hereafter "**Naoki 136.**"

Regarding Claim 1:

Ebisu discloses A design-aiding device for designing a casting product, the device comprising:

analyzing means for analyzing solidification process based on temperature change of a melted material of the casting product in elapse of time in a three-dimensional model that corresponds to the casting product and is formed of a plurality of cells; (**Ebisu. Column 1, Lines 10-30. Column 14, Line 54 – Column 16, Line 32. Column 20, Lines 12-63. Figures 11, 18, and 43. Table 1-3, and 7**)

computing means for computing cell shrinkage porosity occurrence rates of the cells in the three-dimensional model (**Ebisu. Column 1, Lines 10-30. Column 14, Line 54 – Column 16, Line 32. Column 20, Lines 12-63. Figures 11, 18, and 43. Table 1-3, and 7**)

converting means for stratifying the cell shrinkage porosity occurrence rates computed by the computing means and for converting the cell shrinkage porosity occurrence rates to specific gravity values; (**Ebisu. Column 1, Lines 10-30. Column 14, Line 54 – Column 16, Line 32. Column 20, Lines 12-63. Figures 11, 18, and 43. Table 1-3, and 7**)

and quantifying means for quantifying a region shrinkage porosity occurrence rate of a region that is to be evaluated regarding the region shrinkage porosity occurrence rate, by computing a volume with respect to each of the specific gravity values converted by the converting means, multiplying the computed volume by each of the specific gravity values to obtain a product, and then summing up, to obtain a sum, all the products corresponding to all the specific gravity values included in the region, (**Ebisu. Column 1, Lines 10-30. Column 14, Line 54 – Column 16, Line 32. Column 20, Lines 12-63.**

Figures 11, 18, and 43. Table 1-3, and 7

the quantifying means quantifying the region shrinkage porosity occurrence rate as a region specific gravity value by dividing the sum by a volume of the region; (**Ebisu. Figures 7, 10a, 18, and their corresponding descriptions. Volume/Volume Fraction**)

and outputting means for outputting the region specific gravity value. (**Ebisu. Column 17, Lines 15-27**)

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Ebisu does not explicitly disclose converting means...from a result by the analyzing means with an equation where a temperature gradient of the melted material is divided by a square root of a cooling rate of the melted material.

However, Naoki 134 discloses converting means...from a result by the analyzing means with an equation where a temperature gradient of the melted material is divided by a square root of a cooling rate of the melted material. (**Naoki 134. Introduction**)

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the G / \sqrt{R} equation disclosed in **Naoki 134** for the shrinkage porosity occurrence rate discussed in **Ebisu** in order to properly evaluate the shrinkage parameters in solidification.
(Naoki 134. Introduction)

Further, Naoki 136 also discloses converting means...from a result by the analyzing means with an equation where a temperature gradient of the melted material is divided by a square root of a cooling rate of the melted material. (**Naoki 136. Section 2**)

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the G / \sqrt{R} equation disclosed in **Naoki 136** for the shrinkage porosity occurrence rate discussed in **Ebisu** in order to properly evaluate the shrinkage parameters in solidification.
(Naoki 136. Section 2)

Regarding Claim 3:

Ebisu discloses The design-aiding device for designing a casting product according to claim 1, wherein the equation includes, as an initial condition, a supply-stopping temperature at which supply of the melted material is stopped, and wherein the supply-stopping temperature is set based on a kind of the

melted material. (**Ebisu. Column 23, Lines 18-26**)

Regarding Claim 4:

Ebisu discloses The design-aiding device for designing a casting product according to claim 1, further comprising: strata setting means for setting a number of strata of the cell shrinkage porosity occurrence rates, wherein the converting means stratifies the cell shrinkage porosity occurrence rates into the strata. (**Ebisu. Column 17, Lines 1-14. Layering and temperature drop**)

Regarding Claim 6:

Ebisu discloses The design-aiding device for designing a casting product according to claim 1, wherein the region that is to be evaluated regarding the region shrinkage porosity occurrence rate is one of a plurality of regions into which the three-dimensional model is divided. (**Ebisu. Figure 53 and its corresponding description detailing three-dimensional analysis**)

Regarding Claim 7:

Ebisu discloses The design-aiding device for designing a casting product according to claim 1, further comprising:

critical value setting means for setting a critical specific gravity value; (**Ebisu. Table 7 Gravity Calculation**)

and determining means for determining whether the region specific gravity value is not greater than the critical specific gravity value set by the critical value setting means, and advising changing design when the region specific gravity value is determined to be not greater than the critical specific gravity value. (**Ebisu. Table 7 Gravity Calculation**)

Regarding Claim 8:

Ebisu discloses The design-aiding device for designing a casting product according to claim 7, wherein the critical value setting means sets the critical specific gravity value with respect to each of regions into which the three-dimensional model is divided. (**Ebisu. Column 29, Lines 45-62. Table 7**)

Gravity Calculation. Figure 53 and its corresponding description detailing three-dimensional analysis)

Regarding Claim 9:

Ebisu discloses The design-aiding device for designing a casting product according to claim 1, wherein the casting product includes a die-casting product using an alumina alloy. (**Ebisu. Column 34, Line 40**)

Regarding Claim 10, 12-13 and 15-19:

See prior art rejection of claims 1, 3-4, and 6-9 above.

Regarding Claim 19:

Claim 19 recites an intended use in “computer readable medium for use in...” This statement results in an intended use, which is not afforded patentable weight. However, in the interests of compact prosecution the claims limitations have been addressed, see rejection of claim 1 above, assuming Applicants rectify this issue.

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Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. All Claims are rejected.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saif A. Alhija whose telephone number is (571) 272-8635. The examiner can normally be reached on M-F, 11:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-22792279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAA

February 9, 2007

